

Integrated Monitoring AWAREness Environment (IM-AWARE), Phase II

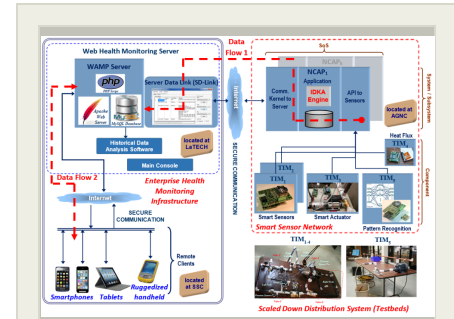
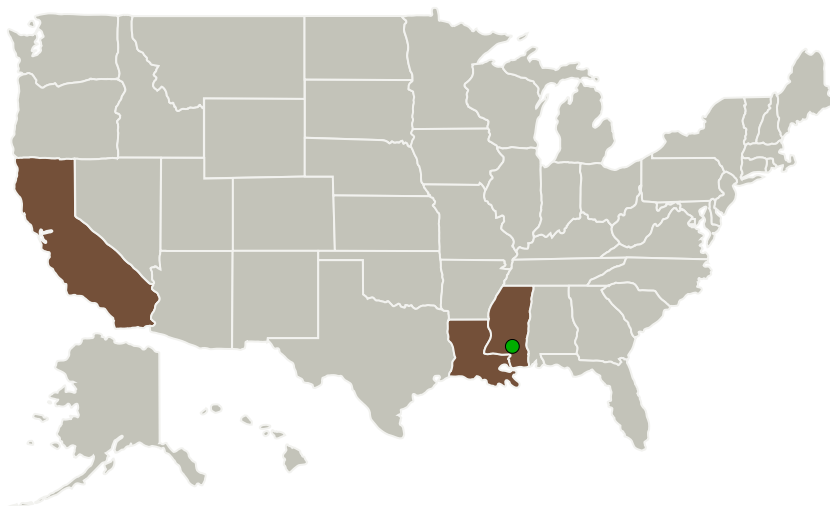
Completed Technology Project (2016 - 2018)



Project Introduction

American GNC Corporation (AGNC) and Louisiana Tech University (LaTECH) are proposing a significant breakthrough technology, the Integrated Monitoring AWAREness Environment (IM-AWARE) consisting of an Enterprise Infrastructure with closely coupled smart sensor networks and Enhanced IT Security to enable: (i) real time monitoring of the distribution systems health; (ii) supporting maintenance operations and configuration management; and (iii) making the system clients aware, in an ubiquitous way, when an entity (sensor, valve, pipeline, motor-pump, etc.) failure is detected. Key components of this infrastructure are: (i) a low level standardized smart sensor network with embedded diagnostics at the sensor and intelligent sensor network coordinator levels and (ii) client-server enterprise infrastructure containing a Database, secure communications, and software applications for smartphones, tablets, and/or ruggedized devices. Key advantages of the system include: (a) novel sensor self-diagnostics with a non-spatial correlation algorithm; (b) novel Timed Failure Propagation Graphs (TFPG) algorithm, for joint sensor/component fault diagnostics; (c) system troubleshooting by stochastic inference that mimics human troubleshooting reasoning; (d) APIs for the TFPGs, Bayesian Networks (BN), and Influence Diagrams to facilitate and expedite diagnostic deployment within custom embedded applications; and (e) ruggedized hardware modules design. Advanced sensing schemes are provided for leakage detection, heat flux applications, and fire detection, in addition to monitoring test facility parameters (flow, pressure, temperature). To provide retrofitting and scalability capability strategies include standardized and scalar smart sensor design as well as software APIs and toolboxes development.

Primary U.S. Work Locations and Key Partners



Integrated Monitoring AWAREness Environment (IM-AWARE), Phase II

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Images	3
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3



Organizations Performing Work	Role	Type	Location
American GNC Corporation	Lead Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Simi Valley, California
Louisiana Tech University(LA Tech)	Supporting Organization	Academia	Ruston, Louisiana
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations

California	Louisiana
Mississippi	

Project Transitions

▶ **September 2016:** Project Start

✓ **September 2018:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140804>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

American GNC Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

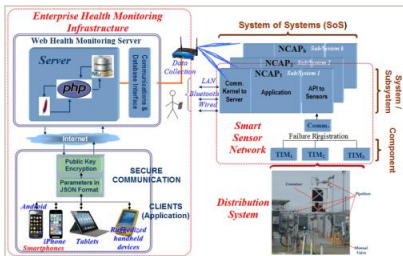
Francisco Maldonado

Co-Investigator:

Francisco G Maldonado

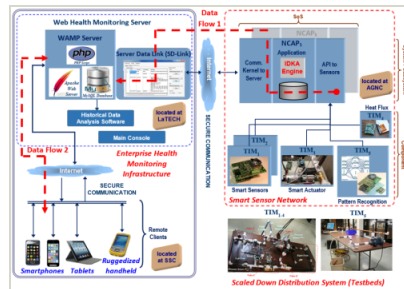


Images



Briefing Chart Image

Integrated Monitoring AWAREness Environment (IM-AWARE), Phase II (<https://techport.nasa.gov/image/129459>)

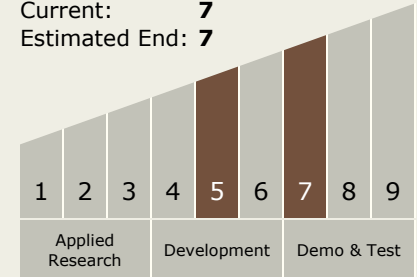


Final Summary Chart Image

Integrated Monitoring AWAREness Environment (IM-AWARE), Phase II (<https://techport.nasa.gov/image/135249>)

Technology Maturity (TRL)

Start: 5
Current: 7
Estimated End: 7



Technology Areas

Primary:

- TX04 Robotic Systems
 - TX04.2 Mobility
 - TX04.2.5 Robot Navigation and Path Planning

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System